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Possible solutions to the question of insolvency – empirical analysis regarding the degree of exposure of the solvency of Romanian insurance companies

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Abstract

This paper tackles a broad topic by endeavouring to find solutions to avoid insolvency in regard to insurance companies in Romania. The maintenance of the solvency state of insurance companies requires them to have the ability to honour their obligations to policyholders and beneficiaries of the contract. We analysed solvency as a dependent variable - as compared to the degree of the exposure of solvency, since solvency is, in our opinion, a key element in the management of assets and liabilities, and is a topic that is currently preoccupying researchers.The importance of the research is underlined by the fact that this subject is highly relevant in regard to insurance companies who have been subject to increased market demands in a business environment that have become difficult to navigate. Through the study conducted, built on relevant opinions from academic literature, we chose as the objective of the research, the identification of the influence variables and the intensity with which they impact the degree of exposure of the Romanian insurance company's solvency. Our analysis led to the identifications of new elements that can optimize the effects of the insolvency law as applied to insurance companies in Romania.

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1. Introduction

Our attention was captured by the issue of the solvability of Romanian of insurance companies, which is currently the subject of concern for both national and international control bodies and researchers in the field. In the conditions of a common market in Europe, the existence of a robust and efficient system of prudential supervision of the insurance sector is particularly important (Ciumas, 2003). This seems to be the headway of the European Union as well, which has developed a model of solvency - Solvency II - which takes into account the risks to which the insurer is subject to, the level of market development, asset management correlated with liabilities and, lastly, the issue of reinsurance (Eling, 2006).

The analysis that we have undertaken considers the Romanian insurance market for a period of five years, i.e. 2008-2012. We considered the insurance companies that are established and operating in accordance with the relevant legislation, which function commercially by offering, mediating, negotiating, and signing insurance and reinsurance contracts, by collecting premiums, liquidating damages, engaging in regression activity and recovery as well as managing the investment of its own funds gained by its activity (we will use, in our study, a group of 45 Romanian companies). The empirical study of the degree of exposure of the solvency of insurance companies in Romania is achieved by panel modelling.

We started the solvency analysis from the theory and arguments proposed by Kielholz (2000). According to the author, the insurer's capital derives from investors which mean that there is a cost attached to it. He also assumes that, in the insurance business, there is a tendency towards simplification. In this sense we can say that insurance companies do not transfer the insolvency risk to their management. In his opinion, however, the purpose of capital maintenance is the avoidance of insolvency. Thus, insurers who face a high risk of insolvency bear higher costs of capital.

The evolution of insolvency viewed through the lens of the degree of exposure of solvency in the study interval is neither uniform nor similar for the three categories of companies chosen as the sample for our analysis. General insurance and life insurance companies, up to 2011, seem to bear similarities regarding the degree of exposure of solvency but after that they follow divergent directions. From 2010 general insurance witnessed a drop in the debt-to-equity ratio. Life insurance provided a development characterized by a constant alternation of rises and falls of the value of the degree of exposure of the solvency yearly, the highest value recorded was that of 2012. General and civil liability insurance companies are characterized by almost continuous increase of the degree of exposure of company's solvency due to the increase in the debt to total equity report.

2. The Romanian insurance market case study

2.1. Description of variables

Since the existing public data regarding the Romanian insurance companies do not allow for the calculation of solvency according to legal specifications we watched the evolution of solvability through the use of a proxy, called the degree of exposure of solvency, calculated as ratio between the total debt and the equity value (the dependent variable).

Thus, based on the data from Table 1 on the descriptive analysis of the averages of the degrees of exposure of solvability during our study interval (from 2008 to 2010), we highlight a significant difference between the average and maximum value in 2010 and 2012. This result helps us deduce that the differences are due to internal factors of the insurance companies.

Table 1. Descriptive analysis of the degrees of exposure of solvability of the underwriting activity

Degrees of exposure of solvability	2008	2009	2010	2011	2012
Medium value	0,33	0,32	0,47	0,34	0,62
Minimum value	0	0	0	0	0
Maximum value	1,85	1,25	4,37	1,65	6,22

(Source: author's own creation)

It is assumed that the solvency of an insurance undertaking can be managed by maintaining a diversified risk portfolio (Kielholz, 2000). Thus, we choose as a variable the *underwriting degree* quantified as the ratio between the total number of underwritten insurance classes and total regulated classes of general insurance, life insurance and general and civil liability insurance.

Portfolio diversification can be viewed from the perspective of the *reinsurance of insurance companies* (Campbell & Kracaw, 1990). Thus, we chose reinsurance as a variable, quantified as the ratio between the total amount of reinsured premiums to the total amount of underwritten premiums.

Affiliation is also applied in our study as a dummy variable, for which we expect a positive relationship in connection with the degree of exposure of the insurer's solvency (Brenda Wells, 2009). Thus, one can see how an insurance company can ensure a state of solvability through a possible capital infusion from the company to which it is affiliated. Moreover the amount of shares that the affiliate owns in company in affiliates with acts as a barrier, protecting the insurer against the risk of solvency through the financial resources available to the affiliate, resources that are independent of the insurance company own resources.

Shareholder structure of the insurance company, viewed as ownership of the local/foreign capital of the company, becomes relevant in the context of the presence of foreign equity ownership which ensures the stability of the company, in the context of the diversified shareholder structure with foreign components which help ensure a vision of sustainable development, with managemetn of existing risks in the international market. Thusly we cushion any decision pattern prone to risky decision-making of the management of the company, ensuring sustained solvency of the insurance company. Considering the above, we expect a negative relation between the level of exposure of solvency and the shareholder structure. We mention that this analysis uses a dummy variable to quantify the shareholder structure, where value 1 is used when there are foreign shareholders in the shareholder structure, 0 when they do not exist.

Business risk expressed as the damages rate *(*Adams & Hardwick, 2003*)* will be determined as the ratio between the total gross damages and the value premiums for a period of one year. Based on the study by Cummins and Danzon, which argues that a high damages rate can cause managers to increase the underwriting activity to avoid the increased risk of solvency, we can further the interpretation and anticipate a positive relationship between the business risk and the degree of exposure of the solvency of insurance companies.

Another variable that we believe influences the insurer's solvency is *liquidity* (Abdul Kader, 2010)*,* quantified through the perspective of the liquidity ratio regulations ingrained in the Romanian insurance market. Between this variable and the degree of exposure of the solvency, we assume a negative relationship.

A positive relationship can be determined between the ability of a company to reorganize in order to avoid insolvency and *the company's size* (Cummins, Philips and Smith, 1997). In this context we expect a negative relationship between the company's size and the degree of exposure of the solvency.

Table 2. Values of the descriptive explanatory variables

Explanatory variables	2008	2009	2010	2011	2012
Underwriting degree					
Medium value	0,33	0,40	0,44	0,46	0,49
Minimum value	0	0	0	0	0,05
Maximum value	0,94	0,94	1	1	1
Reinsurance					
Medium value	0,17	2,32	0,24	0,18	0,20
Minimum value	0	0	0	0	0
Maximum value	0,82	96,68	3,88	0,92	0,88
Business risk					
Medium value	0,21	30,91	0,96	0,34	0,57
Minimum value	0	0	0	0	0
Maximum value	0,82	848,86	11,18	1,14	7,91
Shareholder structure					
Medium value	0,81	0,84	0,83	0,83	0,83
Minimum value	0	0	0	0	0
Maximum value	1	1	1	1	1
Liquidity					
Medium value	2,97	6,18	5,90	5,75	6252,9
Minimum value	1,08	0,39	1,1	1,1	1,03
Maximum value	20,96	80,01	57,78	51,55	180280
Business risk					
Medium value	12,71	15,25	17,14	16,78	17,23
Minimum value	0	0	8,45	0	0
Maximum value	20,96	20,90	20,78	20,71	20,82
Affiliation					
Medium value	0,68	0,77	0,76	0,78	0,75
Minimum value	0	0	0	0	0
Maximum value	20,96	1	1	1	1

(Source: author's own creation)

In 2010, we record significant differences between the minimum and maximum values of the liquidity and business risk (as independent variables), to which we attribute the differences experienced in regard to the degree of exposure of the solvency of insurance companies (see Table 2).

A difference in liquidity level between companies is noticed in 2012 which influence the evolution of solvability on the Romanian insurance market in the span of that year.

2.2. The description of the model

In our study, we analyse the solvency of insurance companies in Romania (the study is conducted on 45 Romanian companies) for a period of five years, i.e. from 2008 to 2012, in terms of the factors of influence, considered independent variables. We apply a panel model in our current analysis.

The value of the Hausman test, for a distribution with 7 degrees of freedom, is 9.65, which means that the null hypothesis is accepted (with a probability of 95%). Therefore, we use the method of random effects specific to insurance companies to estimate our model.

The panel model with random effects specific to economic entities that we used to analyse the influence of different factor on the solvency of Romanian insurance companies has the following structure:

(1)

$$GradExpSolvit = C + aGradsit + b2Riscait + b3Stactit + b4Lichiditit + b5Mărimeit + b6Affiliation + b7Reasigit + \mu + Ɛit$$

with i = 1, 2, ..., 45;
t = 1, 2,..., 5.
μ – the unobservable individual effect specific to each economic entity
Ɛit - residual variable

The dependent variable

GradExpSolvit - the degree of exposure of the insurer's solvency in year t

Independent Variables
Grads - the underwriting degree of insurer i in year t
Riscait - the business risk of insurer i in year t
Stacte - the shareholders' structure of insurer i in year t
Liquidity - the liquidity of insurer i in year t
Mărimeit - the size of the insurance company i for year t
Reasigit - the level of reinsurance of the insurer i in year t

2.3. Empirical Results

As seen in Table 3, the values provided by the correlation matrix of the independent variables of the solvability presents small size correlations, which indicates that it is highly unlikely that multicolinearity exists.

Table 3. The correlation matrix of the independent variables

Independent variables	Underwriting degree	Reinsurance	Business risk	Shareholders structure	Liquidity	Size	Affiliation
Underwriting degree	1,000						
Reinsurance	0,1234	1,000					
Business risk	0,1287	0,8000	1,000				
Shareholders structure	-0,0497	0,0993	0,0959	1,000			
Liquidity	-0,0755	0,0471	-0,3507	0,1078	1,000		
Size	0,5806	-0,1410	-0,1382	-0,0471	-0,0360	1,000	
Affiliation	0,1817	0,1736	0,1382	0,2460	0,1010	0,2132	1,000

(Source: author's own creation)

As a way to estimate the parameters we use a generalized method of moments, with a combination between the panel models with fixed effects and the instrumental variables technique. This type of estimator is applied to correct endogeneity of the autoregressive variable, determining at the same time the endogenous explanatory variables. The results obtained are shown in Table 4.

Table 4. The model estimation results - the degree of exposure of the solvency of insurance companies

Independent variables	Coefficients
The underwriting degree	0,183(0,619)
Reinsurance	-0,777(0,018)**
The business risk	0,250(0,046)**
Shareholders structure	-0,177(0,372)
Liquidity	-0,002(0,070)*
The company's size	0,002(0,070)*
Afiliation	0,36(0,057)*
Wald(8)(i)	28
Number of instruments used	96
Number of observations	17,09

(Source: author's own)

Note: In parentheses are shown the probabilities correlated with the t test. * Significant t test with 90% probability, ** Significant with 95% probability, *** Significant with 99% probability (i) the Wald test is a test with one distribution of the overall significance of the model parameters with a null hypothesis and the lack of correlation between coefficients.

The results provided in Table 4 indicate that the following variables are considered statistically significant:

- with a probability of 95%: *reinsurance, the business risk;*
- with a probability of 90%: *the company's size, liquidity and affiliation.*

We also note that *the underwriting degree* and *the shareholders' structure* with a probability of 95% is not significant in terms of the influence that they may have on the degree of exposure of the solvency of insurance companies. This result can be interpreted either by a mismatch of the variables with the specificity of the Romanian insurance market, or by assignment of inadequate formulas.

An image of the relationship between *the exposure degree of solvability* and *reinsurance* is indicated by *the coefficient -(-0.777)* (see Table 4), indicating a negative relationship between reinsurance and the ratio of debt to equity, confirming our initial hypothesis, that diversification through reinsurance reduces the risk of insolvency.

There is a positive relationship between *the business risk* and *the degree of exposure solvency* if we consider *the coefficient -0.250* (see Table 4), which confirms our assumption, namely that a high ratio of total gross damage causes an increase in total debt equity which in turn increase the risk of insolvency.

The assumption that the liquidity problems of a society may influence its ability to fulfil its obligations to third parties is confirmed by the Romanian insurance market through the empirical analysis conducted, based on the coefficient of the independent variable *liquidity -(-0.002)* (see Table 4). The coefficient indicates a negative relationship between liquidity and the exposure of the company, i.e. a high level of liquidity reduces the exposure degree of solvency.

With regard to the issue of the company's size, we started with the assumption that a large size company has safeguards that can be implemented in the event of a insolvency risk, which is not confirmed on the Romanian insurance market, since an increase in the company's size seems to increases the risk of insolvency, a fact indicated by *the company's size - 0,002* which resulted from our empirical analysis on the solvency of Romanian insurance companies (see Table 4).

In the study we have conducted, we have identified a positive relationship between affiliation and the degree of exposure of the insurer's solvency based on a *coefficient of - 0.36* (see Table 4). This result indicates that the insolvency states generated by the increase in total debt to equity ratio increases with an increasing

affiliation of the Romanian insurance companies, which contradicts our initial assumption regarding this particular variable.

3. The solutions offered by way of the empirical analysis

In the pursuit of value maximization Romanian insurance companies cannot afford to dispense with the solvency compliance rules. Taking into account the results of the empirical analysis of the degree of the exposure of the solvency of insurance companies we have undertaken, namely the significant factors that influence the element, we consider it appropriate to state that in order to avoid the risk of insolvency of the insurer, the Romanian insurance supervisory body needs to monitor the insurance business carried on by companies, by considering the company's size correlated with the damages rate and the value of reinsurance (in addition to the already regulated capital adequacy and liquidity ratio issues).

Thus when an increase to the company's size is correlated with decreased liquidity, an increase in the damage rate and a decrease in reinsurance, an emergency trigger should be activated since the insurance company may be headed towards a state of insolvency.

4. Conclusions

Through the research conducted on the Romanian insurance market between 2008 and 2012, we sought to identify, on the foundation of the work done by our academic predecessors, the varying and noteworthy influences of insurance companies' solvency.

Through the undertaken empirical analysis of Romanian insurance companies, in regard to the factors that will influence the degree of exposure of the solvency of insurance companies, we have concluded the following:

• Our initial hypothesis, that diversification through *reinsurance* reduces the insolvency risk, was completely confirmed.

• *Liquidity issues* of the insurance company can be observed where the insurers invests heavily in fixed assets and/or are unable to control their debtor pool, which could affect their ability to fulfil their obligations to other third parties.

• On the Romanian insurance market, an increase of *the size of the company* will increases the risk of insolvency of the insurer.

• An increase of the total debt to equity capital ratio is registered in case of an increase in the affiliation percentage of the Romanian insurance companies.

• A high ratio of total gross damage to total premiums causes an increase of the debt to equity capital ratio and an increase of the solvency risk.

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